1.(Currently Amended) A method for producing a solid filament ~~(1)~~ from a liquid ~~(2)~~ in a vacuum chamber ~~(70), with the steps~~, comprising:

- ~~liquefaction of~~ liquefying a gas in a heat exchanger device ~~(20)~~ for producing the liquid ~~(2)~~, wherein the liquefying of the gas in the heat exchanger device comprises adjusting a p-T operating point of the liquid, and
- supplying ~~of~~ the liquid ~~(2)~~ via a supply line ~~(27)~~ and through a nozzle ~~(30)~~ into ~~the~~ a vacuum chamber ~~(70)~~,

~~characterized in that~~

~~the liquefaction of the gas in the heat exchanger device (20) comprises the adjusting of a p-T operating point of the liquid (2) at which the liquid (2)~~ wherein the liquid is converted into the solid aggregate state after exiting from the nozzle ~~(30)~~ into the vacuum chamber ~~(70)~~ and forms a collimated and stable jet.

2.(Currently Amended) The method according to ~~Claim~~ claim 1, ~~in which~~ wherein the adjustment of the p-T operating point of the liquid ~~(2)~~ comprises ~~a~~ tempering ~~of~~ the liquid in the heat exchanger device ~~(20)~~ to an operating point temperature $T_0$ below which the liquid becomes solid.

3.(Currently Amended) The method according to ~~Claim 1 or 2, in which~~ claim 1, wherein the adjustment of the p-T operating point of the liquid ~~(2)~~ comprises ~~a~~ tempering ~~of~~ the liquid in the heat exchanger device ~~(20)~~ to an operating point temperature $T_0$ that is less than 1 degree above the triple point $T_T$ of the liquid ~~(2)~~.

4.(Currently Amended) The method according to ~~at least one of the preceding claims, in which~~ claim 1, wherein the tempering of the liquid ~~(2)~~ takes place while it flows through the supply line ~~(27)~~.

5.(Currently Amended) The method according to ~~Claim~~ claim 4, ~~in which~~ wherein the tempering of the liquid ~~(2)~~ takes place along the supply line ~~(27)~~ up to the nozzle ~~(30)~~.

6.(Currently Amended) The method according to ~~at least one of the preceding claims, in which~~ claim 1, wherein a temperature gradient is formed along the supply line ~~(27)~~ in the heat exchanger device ~~(20)~~ that is less than 2 degrees/cm.

7.(Currently Amended) The method according to ~~at least one of the preceding claims, in which~~ claim 1, wherein the tempering takes place in the heat exchanger device ~~(20)~~ with a liquid cooling medium.

8.(Currently Amended) The method according to ~~Claim~~ claim 7, ~~in which~~ wherein the temperature of the cooling medium is adjusted with a thermostat ~~(40)~~.

9.(Currently Amended) The method according to ~~Claim 7 or 8, in which~~ claim 7, wherein a temperature or a vapor pressure of the cooling medium is measured in the heat exchanger device ~~(20)~~.

10.(Currently Amended) The method according to ~~at least one of the preceding claims, in which~~ claim 1, wherein an optical measuring of the liquid ~~(2)~~ exiting into the vacuum chamber ~~(70)~~ takes place.

11.(Currently Amended) The method according to ~~Claim 9 or 10, in which~~ claim 1, wherein at least one of ~~the parameters~~ gas pressure, supply volume of the cooling medium and temperature of the cooling medium in the heat exchanger device ~~(20)~~ is adjusted as a function of the result of ~~the~~ a temperature measurement, ~~the~~ a vapor pressure measurement or ~~the~~ an optical measurement.

12.(Currently Amended) The method according to ~~Claim~~ claim 11, ~~in which~~ wherein a control circuit is formed for adjusting the at least one parameter.

13.(Currently Amended) The method according to ~~at least one of the preceding claims, in which~~ claim 1, wherein the liquid ~~(2)~~ in the nozzle ~~(30)~~ is subjected to a jet formation.

14.(Currently Amended) The method according to ~~at least one of the preceding claims, in which~~ claim 1, wherein the supplied gas is a noble gas.

15.(Currently Amended) The method according to ~~Claim~~ claim 14, ~~in which~~ wherein the supplied gas is xenon.

16.(Currently Amended) The method according to ~~at least one of the preceding claims, in which~~ claim 1, wherein the p-T operating point of the liquid ~~(2)~~ is selected in such a manner that the liquid ~~(2)~~ becomes solid after exiting from the nozzle ~~(30)~~ within a freezing length (a) that is less than 10 mm.

17.(Currently Amended) A nozzle arrangement ~~(10) especially~~ for producing solid filaments ~~(1)~~ in a vacuum, ~~that comprises~~ comprising:

- a heat exchanger device ~~(20)~~ for producing a liquid ~~(2)~~ from a gas, ~~and~~

~~- a supply line (27) with a nozzle (30) through which the liquid (2) can exit into the vacuum,~~

~~characterized in that~~

wherein the heat exchanger device ~~(20)~~ is adapted for adjusting a p-T operating point of the liquid ~~(2)~~ such that the liquid ~~(2)~~ can be converted after exiting from the nozzle ~~(30)~~ into ~~the~~ a vacuum into ~~the~~ a solid aggregate state and a collimated and stable jet form, and

- a supply line with a nozzle through which the liquid can exit into the vacuum.

18.(Currently Amended) The nozzle arrangement according to ~~Claim~~ claim 17, ~~in which~~ wherein the heat exchanger device ~~(20)~~ extends along the supply line ~~(27)~~.

19.(Currently Amended) The nozzle arrangement according to ~~Claim~~ claim 18, ~~in which~~ wherein the heat exchanger device ~~(20)~~ extends along the supply line ~~(27)~~ up to the nozzle ~~(30)~~.

20.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims 17 to 19, in which~~ claim 17, wherein the heat exchanger device ~~(20)~~ extends over a length of at least 40 cm along the supply line.

21.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims 17 to 20, in which~~ claim 17, wherein the supply line ~~(27)~~ runs helically through the heat exchanger device ~~(20)~~.

22.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims 17 to 21, in which~~ claims 17, wherein the supply line ~~(27)~~ has a wall thickness in a range of 0.1 mm to 0.5 mm.

23.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims 17 to 22, in which~~ claim 17, wherein the heat exchanger device ~~(20)~~ is a counterflow cooler.

24.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims 17 to 23, in which~~ claim 17, wherein the heat exchanger device ~~(20)~~ contains a liquid cooling medium.

25.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims 17 to 24, in which~~ claim 17, wherein the heat exchanger device ~~(20)~~ comprises a tubular cooling jacket ~~(21) on whose end (22)~~ and the nozzle ~~(30)~~ is arranged at an end of the cooling jacket.

26.(Currently Amended) The nozzle arrangement according to ~~Claim~~ claim 25, ~~in which~~ wherein the nozzle ~~(30)~~ is demountably arranged on the cooling jacket ~~(21)~~.

27.(Currently Amended) The nozzle arrangement according to ~~Claim 25 or 26, in which~~ claim 25, wherein the nozzle ~~(30)~~ is adjustably arranged on the cooling jacket ~~(21)~~ in such a manner that the orientation of a dispensing direction of the nozzle ~~(30)~~ can be changed relative to a longitudinal extension of the cooling jacket ~~(21)~~.

28.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims 17 to 27, in which~~ claim 17, wherein a screening device ~~(35)~~ is provided that serves for thermal insulation of the nozzle ~~(30)~~.

29.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims 25 to 28, in which~~ claim 25, wherein a fastening device ~~(50)~~ is provided for fastening the cooling jacket ~~(21)~~ to a vacuum flange.

30.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims 25 to 29, in which~~ claim 25, wherein the heat exchanger device ~~(20)~~ is connected to a thermostat ~~(40)~~ with which the cooling medium in the heat exchanger device ~~(20)~~ can be tempered.

31.(Currently Amended) The nozzle arrangement according to ~~Claim~~ claim 30, ~~in~~ ~~which~~ wherein the thermostat ~~(40)~~ is arranged ~~in~~ such ~~a manner~~ that it is decoupled from oscillations relative to the heat exchanger device ~~(20)~~.

32. Currently Amended) The nozzle arrangement according to ~~Claim 30 or 31, in~~ ~~which~~ claim 30, wherein the heat exchanger device ~~(20)~~ is connected via thermally insulated lines ~~(24, 25)~~ to the thermostat.

33.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims~~ ~~17 to 32, in which~~ claim 17, wherein a temperature sensor or vapor-pressure sensor is arranged in the heat exchanger device ~~(20)~~.

34.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims~~ ~~17 to 33, in which~~ claim 17, wherein the supply line ~~(27)~~ opens at the nozzle ~~(30)~~ with a ~~given~~ convex inside contour ~~(32)~~ into an exit opening.

35.(Currently Amended) The nozzle arrangement according to ~~at least one of Claims~~ ~~17 to 34, in which~~ claim 17, wherein the nozzle ~~(30)~~ is detachably connected to the supply line ~~(27)~~, a seal being arranged between the nozzle ~~(30)~~ and the supply line ~~(27)~~ which seal consists of an alloy of copper and beryllium.

36.(Currently Amended) An apparatus with a vacuum chamber ~~(70)~~ and a nozzle arrangement ~~(10)~~ according to ~~at least one of the preceding claims~~ claim 17 for producing a solid filament from a liquid in the vacuum chamber ~~(70)~~.

37.(Currently Amended) ~~The use~~ A method of ~~a method or of~~ using a nozzle arrangement according to ~~at least one of the preceding claims~~ claim 17 for producing a frozen filament with a length of at least 10 cm and a diameter in a range of 10 µm to 100.